Thin-striped Wattle Cicada (*Ewartia roberti*)

METAMORPHOSIS

AUSTRALIA

Magazine of the Butterfly & Other Invertebrates Club

ISSUE NO: 87 DATE: DECEMBER 2017 ISSN: 1839-9819
Price $6.00 http://www.boic.org.au

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Planning and Organization Meetings

A quarterly meeting is scheduled in order to plan club activities and the magazine. See BOIC Programme.

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Membership fees are $30 for individuals, schools, and organizations.

Aims of the Organization

- To establish a network of people growing butterfly host plants;
- To hold information meetings about invertebrates;
- To organize excursions around the theme of invertebrates e.g. butterflies, native bees, ants, dragonflies, beetles, freshwater habitats, and others;
- To promote the conservation of the invertebrate habitat;
- To promote the keeping of invertebrates as alternative pets;
- To promote research into invertebrates;
- To encourage the construction of invertebrate friendly habitats in urban areas.

Magazine Deadlines

If you wish to submit an item for publication the following deadlines apply:
March issue – February 1st June issue – May 1st
September issue – August 1st December issue – November 1st
All articles should be submitted directly to the Editor daphne.bowden1@bigpond.com

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Cover Photo

Thin-striped Wattle Cicada (*Ewartia roberti*) – Photo Lindsay Popple

From the President

Rob MacSloy has served as Treasurer of the club since its inception 23 years ago. We recently nominated him for an award and at our meeting on November 11th last, he was presented with a certificate issued by the Commonwealth Bank in recognition of his many years of service. Rob has been honoured in another way but I will let you read the magazine to discover how this came about!

It is so easy to take things for granted when all is running smoothly for the club but it should be recognised that Daphne quietly and efficiently handles a lot of "adminis-trivia" to keep us "ticking over" as well as bringing together the work of others to produce our quality magazine. Thank you again, Daphne.

We are deeply grateful to those who have once again contributed to making this edition an informative and interesting read. Thank you.

The club's mistletoe book published and launched in April last year has been well received and I suspect many of you already have a copy. However, we have decided to feature one mistletoe species in each magazine. Enjoy.

Best wishes, *Ross*

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The Treasurer's New Cicada – *Lindsay Popple*

Most invertebrate natural history studies involve visual surveys, the setting of elaborate traps and/or dedicated efforts in rearing to bring these smaller life forms within the range of close visual inspection. Cicadas, like birds, offer a different method of detection: their sound. Each species of cicada makes its own unique acoustic signature, termed the calling song. The calling song is made by the male cicadas for the purpose of attracting females. It is necessary for the calling song structure to be unique to the species so that it can be recognised by females of the same species. Through experience, it can become possible for human observers to recognise the calling songs of different species. With practice, it is possible to recognise many species calling simultaneously. Indeed, it can even become almost second nature for dedicated observers to make an inventory of the local cicada fauna, just by pausing for a moment when outdoors (or even from the window of a vehicle) to listen to the background sounds.

There are actually very few people who can make lists of cicadas by actively listening to their calling songs. Having the knowledge and experience to identify birds by their call makes a difference. My long-time friend, and the BOIC's very own treasurer, Rob MacSloy, is a good example of someone who has transferred their ability to identify bird call on to cicadas. When we catch up, we spend much of the time travelling across the landscape noting the birds we see (and hear!) and also the cicadas we find at each location. This is an effective and simple way of obtaining distribution records for cicadas.

More than 60 described species of cicadas can be found in the Greater Brisbane region. At least a further 20 or so undescribed, rarely encountered species also occupy the area. Perhaps one of the most ubiquitous small–medium sized cicadas in the region is the Wattle Cicada. In the book, *Australian Cicadas* (Moulds, 1990), it is referred to as *Cicadetta oldfieldi*. This was the name of the species for many years until Moulds (2012) transferred all Australian *Cicadetta* to new genera and, as a consequence, the name was changed to *Ewartia oldfieldi* (the genus *Ewartia* was named in honour of retired geologist and local cicada expert, Tony Ewart).

When one listens to Wattle Cicada males in central eastern Australia, the complexity of the calling song can be quite baffling. Sometimes they make simple monotonously repeated short buzzes or chirps, at other times there are intermittent notes between the short buzzes, but then, in some cases, they can also adapt long and drawn out series of skipping or lilting notes that builds into a buzzing climax, with phrases lasting close to 30 seconds in the most extreme examples. Indeed, cicadas in the genus *Ewartia* can have some of the most complicated calling songs documented for cicadas. The variability and complexity has confounded cicada researchers for some time. Tony

Despite their striking appearance, wattle cicadas (genus *Ewartia*) seem to camouflage quite well on the stems of their food plants.

Ewart was the first to suggest that *E. oldfieldi* may actually be a complex of multiple cicada species associated with wattles.

When making cicada observations and lists, Rob and I use a short-hand, three-digit numbering system to identify the species. In the beginning of this exercise (the late 90s), Wattle Cicada for us was always number 231, but even locally around Greater Brisbane there seemed to be apparent variation. Some specimens in the hand were bright green, whereas others were reddish-brown. Some produced short song phrases, others long and extended. I also noticed that the more extended calls sounded slightly higher pitched. Further down the track, I came to the conclusion that the reddish-brown ones seemed to be associated with the shorter song phrases, and the green ones were the extended. With some potential structuring now identified, I restricted number 231 to the green, extended call examples and allocated the number 230 to the brown, shorter call ones.

A pair of Rob's cicadas (*Ewartia roberti*; male above, female below) sitting on a banksia adjacent to their wattle food plant.

With this new found potential diversity to explore, I set about travelling across the distribution of the former Wattle Cicada collecting new specimen material, song recordings and making observations. I even ventured further afield and found another Wattle Cicada in the Top End. After borrowing specimens from other researchers like Max Moulds, Kathy Hill and David Marshall, I found that there were even more species in the Northern

Territory and one in Cape York. I also revealed some interesting distribution and song patterns in Queensland, including a more inland form, which in appearance, looked superficially like something in-between 230 and 231, but it received a new number (229).

Broad-striped Wattle Cicada (true *Ewartia oldfieldi*) showing its especially bold, reddish-brown central 'stripe'.

Thin-striped Wattle Cicada (*Ewartia roberti*) is pale brown with a subtle, brown stripe.

In south-east Queensland, I found that the 229, 230 and 231 overlap at many sites, but they generally occur on different wattles. They had subtle but consistent differences in dorsal markings and consistent differences in song patterns, which indicated separate species status was warranted. Examination of the original type specimens of *Ewartia oldfieldi* (described originally as *Melampsalta oldfieldi*) from Bundaberg, showed that these matched 230. This meant that new names needed to be given to the other two species. I had been planning to name a cicada after Rob for some time in recognition of his efforts in making cicada observations over many years, so in the Popple (2017) paper, I named 231 *Ewartia roberti*. So now Rob can view the cicada in a new light, although like me, I am sure that part of his brain still thinks 231 immediately upon recognition of its call.

The more inland cicada, which turned out to have a more variable song than the other two was named *Ewartia lapidosa*. Through following simple leads and knowledge gathering over approximately 12 years, there is now much clearer information on the

ecology of these cicadas, with each having overlapping, but also different geographical distributions, substrate associations and wattle associations.

Following the revision in Popple (2017), true *Ewartia oldfieldi*, now known as Broad-striped Wattle Cicada, is found between the tropic of Capricorn and the Queensland/ New South Wales border, extending inland to the Western Downs. It is known to primarily be associated with Early-flowering Black Wattle (*Acacia leiocalyx*), which grows in sandy and gravelly soils in open forest and scrub. At dusk, this species calls prominently, with a fast repetitive 'dit-derrrrr-dit-derrrrr' or 'ditit-derrrrr-dit-derrrrr'. During it also produces this call at times, but often breaks it up into a repeated and regular 'dit-zit-dit-dit-dit-dit-dit-derrrr', or 'dit-dit-dit-dit-dit-dit-dit-derrrr'.

Ewartia roberti (Thin-striped Wattle Cicada) is found from south-east Queensland south to the mid north coast of New South Wales and inland to the Warrumbungles. It occurs on a variety of wattles from the 'fern-leaved' Green Wattle (*Acacia irrorata*) to the large fleshy phyllodes of Yellow Wattle (*Acacia flavescens*). In Greater Brisbane, it is commonly found on Brisbane Wattle (*Acacia fimbriata*) and is quick to colonise new plantings of this species in association with bush regeneration projects and on median strips. At dusk, this species produces a monotonous 'zerrrrr zerrrrr zerrrrr zerrrr' call. It also produces this call at times during the day, but more often breaks out into phrases of ~20 s duration, which contain a long cadence of skipping or lilting notes ending in a series of buzzes, with the longest being at the end. Its call is slightly higher pitched than *E. oldfieldi*.

Ewartia lapidosa (Inland Wattle Cicada) is more widespread, occurring from near Georgetown in north-west Queensland south to Mount Hope and the Capertee Valley in New South Wales. It is found on a variety of wattles with medium-sized phyllodes growing in harsh, sandy or stony environments and on rock pavements. At dusk, this species can be heard making an incessant and rapidly-emitted 'ze-ze-ze-ze-ze-ze-ze-ze-ze-ze'. The same calling song is produced during the day, but the males also produce a longer cadence, similar to *E. roberti*, but ending abruptly in a short buzz or series of short buzzes. The duration of each phrase in the longer song component is quite variable in this species, especially in Queensland. Across most of southern Queensland, between the Great Dividing Range and Charleville, the song phrases are quite short, lasting 1–3 seconds. In central and northern areas, the phrases can be much longer, often 8–14 seconds, but up to as high as 27 seconds in the Nebo area. This variation may be a sign of incomplete divergence or the early stages of divergence. Alternatively, it may be incidental variation that has little (if any) consequences on mate recognition.

Inland Wattle Cicada (*Ewartia lapidosa*) has a darker stripe than *E. oldfieldi* and *E. roberti*, but otherwise is very similar in appearance.

The recently completed study on wattle cicadas is yet another study that has revealed multiple species within what was previously considered to be a single species (see also Popple, 2013). There are undoubtedly many other cases in cicadas and invertebrates in general that still await discovery and confirmation. This is one aspect that makes the study of these organisms both enjoyably challenging and rewarding. Knowing what I know now about the wattle cicadas, it is almost hard to imagine *Ewartia roberti* and *E. lapidosa* being considered the same species as *E. oldfieldi*, as each of these three species is very distinctive in its own right.

One of the best outcomes of the study has been the opportunity to name such a charismatic cicada after Rob. I think it is particularly appropriate given that *Ewartia roberti* would perhaps be the most widely encountered wattle cicada in Greater Brisbane. Rob's talents in identifying cicadas by sound are not to be underestimated and it has been an honour and a privilege to be his friend and to acknowledge his contribution to cicada knowledge in this way.

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Photos Lindsay Popple

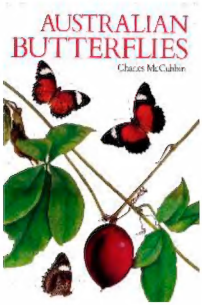
On Accumulating a Butterfly (Book) Collection – *Alan Hyman*

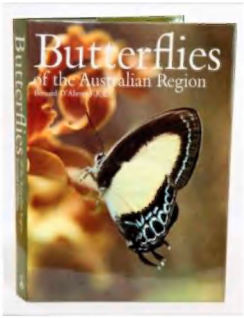
Someone who builds a traditional printed library these days is likely to be seen by 'progressive' sections of society as quaint, old fashioned or retrograde. If the library's components happen to include butterfly books, add 'eccentric'. Be that as it may, for the lepidopteran enthusiast there is always something rather special in unearthing a new, unusual or rare book on this eclectic subject. Whether it is a scientific reference field guide, photographic essay, popular work, historic art volume or biography, I've found much satisfaction and excitement over the years in each new discovery and some of these I've mentioned below. Perhaps there are other collectors who have had similar experiences.

Having become interested in collecting butterflies at an early age, it seems appropriate that a 10th birthday present from my father was a butterfly book. This was 'The Butterflies of Australia & New Guinea' by Charles Barrett and Alex N. Burns, a 1951 publication and the first substantial work available on the subject since Dr. G.A. Waterhouse's (1932) 'What Butterfly is That?' Shortly afterwards, I was due to have a tonsillectomy and the book became a comforting companion during my hospital stay. (A few years later I was to meet a tolerant Alex Burns at the Australian Museum (Sydney) where he patiently showed an eager young teenager a few drawers of *Papilio aegeus* from the Museum's 'official' collection and hand wrote in a mature script, addresses where I might obtain such items as entomological pins.)

While I maintained a background interest in the subject – school studies, then work and tennis predominated and nothing more was obtained until the early 1970's when several major books on Australian butterflies were unleashed within a short space of time. There had been talk of reprinting the Waterhouse volume for some years but the major factor in preventing this was that neither Neville Cayley's original illustrations nor the printing blocks could be located by the publishers. When these finally resurfaced in 1967, Ian Common and Douglas Waterhouse (nephew of the original author) undertook to revise the work, ultimately becoming a complete rewrite but utilizing Cayley's colour and black and white plates. These were supplemented by new additional plates illustrating species not covered in the original work. The book appeared in 1972 and a friend in the trade ordered a copy for me, selling it at a discount. His boss objected to him lowering the retail price and the two had a heated exchange. My friend quit his position on the spot and consequently I felt rather guilty about him losing his job – until he explained that he had been unhappy with the bookshop management anyway and this incident was merely a catalyst for the termination! I wonder if any other butterfly books have triggered similar crises.

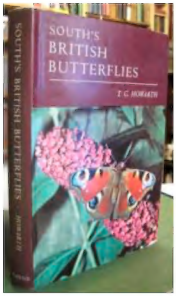
At about the same time, the 'Nature and Field Hobby Centre' at Crows Nest in Sydney was selling all kinds of natural history paraphernalia and books. The proprietor, Lew Simpson, alerted me to two massive upcoming volumes – Charles McCubbin's 1971 'Australian Butterflies' (exquisite water colour illustrations and descriptive text) and Bernard D'Abrera's 1972 'Butterflies of the Australian Region'

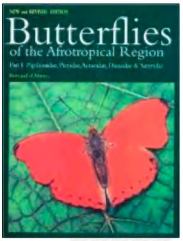


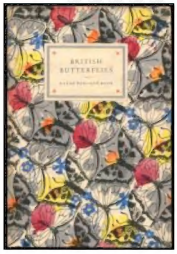


(same size set specimen colour photographs of every known regional species). Both were priced at the princely sum of $25 but bearing in mind that back then the cost of a cappuccino was about 25c, the relative expense becomes apparent. Which to buy? (Eventually, both – my financial situation consequently taking a battering at the time.)

Another find, T.G. Howarth's 1973 edition of 'South's British Butterflies' was a major update on a British entomological classic. One curious entry concerns a species, said to have been taken at Hampstead called 'Albin's Hampsted Eye'. Described by James Petiver in 1717 from a single specimen, Howarth comments: '….it is interesting to speculate on how it came to be recorded from such an unlikely locality and at that period of leisurely travel. At the present time of rapid travel accidentally introduced specimens are much more likely to become frequent'. The point is that today we know this butterfly as the familiar Indo-Australasian species, the Meadow Argus (*Junonia villida*)!

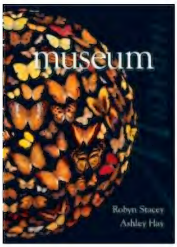


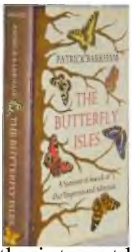




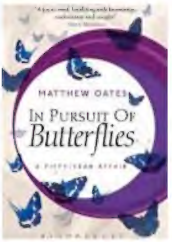
Book browsing can occasionally yield the odd treasure when least expected. For example, in a Chatswood discount bookshop in the early 80's, I came across a whole stack of D'Abrera's 'Butterflies of the Afrotropical Region' – price $35 each! Affordability aside, its size and approximately 5 kilogram weight ensured a logistic limit of 'one per customer'. That such a work was considered by someone to be a 'remainder' seemed inexplicable! On another occasion in 1984, I glimpsed an interesting looking item in a second hand bookshop window from my homeward-bound 257 bus. A lunch hour expedition there the next day delivered another bargain D'Abrera – 'Butterflies of the Neotropical Region Vol.1' in virtually new condition. In more recent times, a NSW country book barn yielded the classic work, 'British Butterflies' (1946 edition), by E.B. Ford, in quite good

order and just $11. The original owner's name was stamped on the top of the flyleaf and at the base, 'Sold by Kelly and Walsh Ltd. Singapore'. The historic travels of this book would probably make an epic tale in its own right! The Canadian volume 'A World for Butterflies – their lives, behavior and future' by Phil Schappert, was extracted for a modest price from the trestle table of a pop-up pre-Christmas book outlet. A few years ago, I found a pristine copy of 'Museum' (Robyn Stacey and Ashley Hay, 2007) the richly illustrated story of the (Sydney) Macleay Museum's natural history collection, including its historic butterflies. This was in a Glebe bookstore for less than a third of its original almost $80 price tag. More recently still, a popular Sydney city discount bookstore yielded a copy of 'The Butterfly Isles'





(2010) by Patrick Barkham, a Cambridge educated features writer. In the book, the author sets out to find every species of British butterfly (there are 60) in a single summer. Beautifully written as an engaging adventure and including colour images of all species, the book is just one of a genre which document a personal passion for, and association with British butterflies. (Did Patrick succeed in his quest? I'll keep you in suspense.) I am not especially a fan of the internet but this medium recently provided the source for two more books in the same mould – 'Rainbow Dust' by Peter Marren (2015), subtitled 'Three Centuries of Delight in British Butterflies', and 'In Pursuit of Butterflies' by Matthew Oates (2015), tracing fifty years of his meticulous diaries as a detailed narrative. All three of these authors are experts in the field, have had an association with the charity Butterfly Conservation in the UK and write in personable, articulate but individual styles. While not autobiographies, the books include enough personal incidents, details and wit to engage the reader on an intimate level. The common subtext for each work is an intense love for butterflies, their physical and philosophical place in the scheme of things, their conservation, the species we are losing and those unfortunately lost. The implications and lessons here are universal.



There are many more new books on lepidoptera available today, across a range of genres and prices. The common theme is the overarching need for butterfly conservation in increasingly hostile local and global environments. Hopefully, proliferation of these books will help create a greater understanding of these benign insects in the wider community and consequently increased awareness of our planet's predicament. The beauty and fragility of butterflies are somehow symbolic of nature generally. This might at least partially explain, (to borrow Sharman Apt Russel's book title), my 'obsession with butterflies'.

Mistletoe profile

Melaleuca or Paperbark Mistletoe
Amyema gaudichaudii
Description
This inconspicuous, delicate mistletoe has small lanceolate leaves 2 to 3.5 cm long and 2 to 5 mm wide. It has the smallest flowers of any loranthaceous mistletoe in the region (7 mm to 10 mm long). The tiny dark red flowers (both petals and stamens) occur in triads (groups of three).
Small spherical fruit (approximately 4 mm in diameter) are a translucent coral-red colour crowned with a black spot – the residual scar of the discarded style/stigma.
Habitat and Host Plants
Host trees are melaleucas, especially Black Tea Tree (*Melaleuca bracteata*) and Paper-bark Tea Tree (*Melaleuca decora*), usually in open swamp woodland dominated by *Melaleuca* species.
Butterflies and Moths
Watson (2011) notes that this mistletoe hosts Spotted Jezebel or Wood White (*Delias aganippe*) and Satin Azure (*Ogyris amaryllis*) butterflies presumably from central coastal NSW, but we are unable to find any records for these, nor have we any experience of this species being used by any butterflies in southern Queensland.
Braby (2000) considered an historical record from Pittsworth in southern Queensland, for the Yellow-spotted Jezebel (*Delias nysa*), to be erroneous, because larvae of this butterfly do not survive on mistletoes other than *Korthalsella* species.
In January 2015, Denis Kitchin found larvae of the Mistletoe Day Moth (*Comocrus behri*) on this species growing in the Tara area of southern Queensland.
Notes
Although this species is recorded nearer the coast further south in central coastal NSW, we were only able to access them near Chinchilla and in the extensive Barakula forest north of the towns of Chinchilla and Miles, under the guidance of local naturalists Grace and John Lithgow. Watson (2011) reports this species in decline in the Sydney area due to "draining of these fragile habitats" for further development.

Comocrus behri (RK)

Amyema gaudichaudii plant (RK)

Amyema gaudichaudii plant (RT)

Amyema gaudichaudii plant (RT)

Amyema gaudichaudii flowers (RK)

Amyema gaudichaudii fruit (RT)

Photos – (RT) Ross Tait (RK) Ross Kendall

The Mystery of a Strange Little Insect – *Linda Sulakatku*

Bringing in the laundry has provided occasional surprises such as unhappy huntsmen spiders. This time it was very much smaller and stranger, no more than 5mm. Watching it crawl along the sheet it appeared to have "paddles" for back legs. Enlarging my photograph of the insect revealed very hairy back legs. It turned out to be a feather-legged assassin bug (*Ptilocnemis* sp.).

Feather-legged assassin bug (*Ptilocnemis* sp.)
Photo Linda Sulakatku

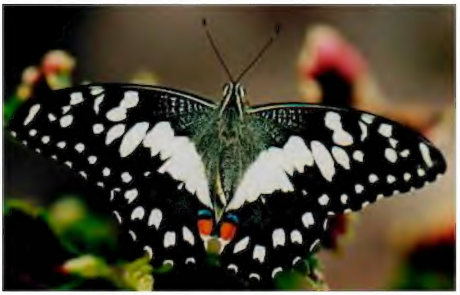
These amazing insects are predators of ants, luring them closer by waving a feathery leg and releasing a scented secretion that attracts the ant. When the ant gets close enough to taste the secretion, all the assassin bug needs to do is grasp the ant's head and stab the ant with its beak (rostrum) in the vulnerable area behind the ant's head. The ant is sucked dry once the bug's digestive juices have liquified the ant's internal organs.

The feather-legged assassin bug made scientific headlines when Matthew Bulbert and his colleagues from Macquarie University revealed how the nymphs of the feather-legged assassin bug species *Ptilocnemis lemur* killed large ants. Not only were these insects still nymphs, but they actually encouraged these venomous bull ants to attack them!

You can watch a video of a feather-legged assassin bug getting its lunch on:
http://www.arkive.org/feather-legged-assassin-bug/ptilocnemus-lemur/video-00.html
You can find out more on the following sites:
New Scientist Zoologger:
https://www.newscientist.com/article/dn25240-zoologger-baby-assassin-bugs-lure-in-deadly-ants/
Australian Museum:
https://australianmuseum.net.au/feather-legged-assassin-bug
CSIRO blog:
https://blog.csiro.au/assassin-bug-lures-ants-to-their-death/
Macquarie University blog:
http://www.mq.edu.au/newsroom/2014/03/21/assassin-bug-uses-a-slight-of-leg-to-deceive-and-subdue-physically-superior-prey/
The Current Biology article:
BULBER, M.W., HERBERSTEIN, M.E. and CASSIS, G., 2014. Assassin bug requires dangerous ant prey to bite first. *Current Biology* **24** (6) R220-R221.

Life history notes on the Chequered Swallowtail, *Papilio demoleus sthenelus* W.S. Macleay, 1826. Lepidoptera: Papilionidae –

Wesley Jenkinson



The Chequered Swallowtail is one of Australia's well-known butterflies and has been recorded from much of the Australian mainland, including the drier interior regions. It has not been recorded from Tasmania.

Unlike many of our Australian butterflies this species is generally more numerous in drier inland areas rather than coastal areas. The adults prefer an open environment including woodland and grassland where host plants are established. During migrations, generally triggered by significant rainfall, adults may also visit the outer margins of dry vine scrub, rainforest and outlying suburban gardens in search of nectar, with the females also searching for host plants for opportunistic ovipositing.

Adults are rapid fliers and can be observed flying in a direct path within one or two metres of the ground during hot, sunny conditions. Whilst feeding momentarily at flowers, the wings continue fluttering rapidly as is typical of the *Papilio* genus. Both sexes feed on a variety of small native and exotic flowers as well as imbibing moisture (mud puddling) along gullies and creek banks during hot conditions. The adults also perch on vegetation close to the ground including the ends of seed stalks, and settle with the wings open. The males do not appear to hilltop.

Variation in this species is only very minor, chiefly being the shape and size of the yellow markings. The sexes are very similar and are best separated by examination of the external genitalia. The blue markings on the upperside hindwing (above both the black costal spot and the orange tornal spot) are also more prominent on the female (Braby, 2000).

The wingspan of the males and females pictured are 73mm and 76mm respectively.

***Papilio demoleus sthenelus* (Chequered Swallowtail)**
Images left to right: male, female.

***Papilio demoleus sthenelus* (Chequered Swallowtail)**
Images left to right: male underside, female underside

Larvae have been recorded feeding on host plants within the Fabaceae and Rutaceae families by various authors as in Braby 2000. Various species of *Cullen* (Fabaceae) are the preferred host plants for this butterfly.

In January 2006 a female was observed laying several eggs on cultivated *Cullen tenax* in my garden at Beaudesert in south-eastern Queensland. She typically fluttered busily around the host plant. Once a suitable spot was located she settled on the host plant, with wings beating rapidly she then curled her abdomen onto a leaf, ovipositing a single egg. Six eggs were laid in a similar fashion and then she flew away. These eggs were laid on the upperside of the leaves and one on a stem of host plant. The larvae were subsequently raised on this host.

The eggs were pale white when fresh (turning pale yellow after a day), smooth, spherical and approximately 1.2 mm in diameter.

Freshly laid egg

1st instar larva

2nd instar larva

3rd instar larva

4th instar larva

5th instar larva

When the first instar larvae emerged the eggshells were consumed. The early instars chewed the upper surface of the host plant. As they began to grow they ate from the

outer edge of the leaves and also consumed the thin stems of the host plant. Larvae fed openly during the day and rested along the upper side of leaves and stems of the host plants. As a defence mechanism the larvae have a strongly pungent scented fleshy osmeterium that they protrude from behind the head to deter predators when disturbed. The larvae completed five instars and largest larva attained a length of 42mm.

Pupa dorsal view

Pupa lateral view

The green pupae measuring up to a length of 32 mm, were located below stems of the host plant. They were attached with silk by the cremaster.

The first adult to emerge had egg duration of 4 days, larval duration 16 days and pupal duration of 11 days. The other pupae emerged several days later but some pupal duration for this species is known to last for several months.

Within the new boundary of the Scenic Rim Regional Shire south of Brisbane, I have adult records from August through to May. In this region there appears to be a spring brood with adults flying during late August and September, then appearing more numerous from January to March. This most likely coincides with local and inland rainfall during these periods.

Acknowledgement: I would like to thank John Moss for commenting on the manuscript.

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Photos Wesley Jenkinson

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New Distribution Records for Polyommatine Butterflies (Lepidoptera: Lycaenidae) in Australia, including Biological Notes. Part III – *Anthene*, *Catopyrops*, *Catochrysops*, *Euchrysops* and *Freyeria* – *Kelvyn L. Dunn*

Summary

This paper lists eleven new and important locations in Queensland, Australia for five species of butterflies from five genera: *Anthene* Doubleday 1847, *Catopyrops* Toxopeus 1929, *Catochrysops* Boisduval 1832, *Euchrysops* Butler 1900, and *Freyeria* Courvoisier 1920 (Lepidoptera: Lycaenidae: Polyommatinae). These species comprise *Anthene lycaenoides* (C. Felder 1860), *Catopyrops florinda* (Butler 1877), *Catochrysops panormus* (C. Felder 1860), *Euchrysops cnejus* (Fabricius 1798), and *Freyeria putli* (Kollar 1844). Notes provided for selected records offer insight into the ecological circumstances of the encounters and the discussion considers the significance of the sites in terms of the species' broader distributions.

Introduction

This third part on the polyommatine butterflies expands knowledge of the distribution of several more species in remote parts of northern Queensland. The species covered comprise *Anthene lycaenoides* (Pale Ciliated-blue), *Catopyrops florinda* (Speckled Line-blue) (Fig. 1), *Catochrysops panormus* (Pale Pea-blue) (Fig. 2), *Euchrysops cnejus* (Spotted Pea-blue) (Fig. 3), and *Freyeria putli* (Jewelled Grass-blue) (Fig. 4). The illustrations show the adults in the field but they are not necessarily from the sites concerned (see captions). This paper records the results from two field trips (from Victoria) to southern and central Cape York Peninsula (January 2001) and to the Gulf Country (September to November 2012). The spelling of scientific names aligns with Braby (2000), the main source used for this distribution-focused study. The spellings of the common names are the contemporary ones, except for the 'Pale Ciliated-blue', which follows Braby (2000), rather than the alternative rendering reinstated by Braby (2016: 284)*.

Methods

The first part of this series on polyommatine butterflies (Dunn 2017a) outlined the means used for routine data gathering to increase the tally of species seen. Use of a semi-structured approach to survey meant that there would be less reliance on serendipity. The same approach helped gather the records included in the second part (Dunn 2017b) and those in this third instalment. The first part also discussed the criteria used to underpin the validity of the identifications, with examination of specimens in the hand being the favoured approach for this group because of their small sizes and similar appearances (see Dunn 2017a). An earlier piece on the thecline lycaenids had outlined the means used to measure distances from fixed points (see Dunn 2016 and relevant references therein), which apply to this series as well.

Results

The table lists five species from eleven new locations (arranged from north to south) across northeastern Australia. All sites fall outside (or if not, then very close to) the boundaries defined or inferred by Braby (2000) for the species concerned and so are new or interesting on that criterion. A superscript indicates that field notes offer additional insight into particular records. These notes are anecdotal and may include references to encounters by other workers in the last decade or so, where their published new locations fall close to those listed in this report. Some may be augmented by one or more historic references where these have been deemed informative. In addition to explaining the importance of particular sites in the table, these notes often discuss the ecological circumstances of the encounters. The times of all observation are in Australian Eastern Standard Time (AEST). Voucher specimens are held in the Australian National Insect Collection (ANIC), ACT, the Museum of Victoria (MV), the Museum of Comparative Zoology, Harvard University (MCZH), USA and the author's holdings (KLDC).

Table: New locations for polyommatine butterflies from beyond their known ranges in Queensland

Species/Location	State	Geocode	Date	Format
Anthene lycaenoides				
10 km SE of Kennedy River crossing	Qld	15°29'S, 144°15'E	11 Jan 2001	Voucher [Note 1]
Little Laura River, 12 km WNW of Laura	Qld	15°31'S, 144°21'E	11 Jan 2001	Voucher [Note 2]
Catopyrops florinda				
Walker Creek crossing, 28km by road NNE of Normanton	Qld	17°28'S, 141°11'E	13 Oct 2012 14 Oct 2012	Voucher [Note 3a] Voucher [Note 3b]
Catochrysops panormus				
15 km NW of Kennedy River crossing	Qld	15°21'S, 144°04'E	11 Jan 2001	Rel.
10 km SE of Kennedy River crossing	Qld	15°29'S, 144°15'E	11 Jan 2001	Voucher [Note 4]
Little Laura River, 12 km WNW of Laura	Qld	15°31'S, 144°21'E	11 Jan 2001	Rel.
Euchrysops cnejus				
Gregory River crossing, Gregory Downs	Qld	18°39'S, 139°15'E	23 Oct 2012	Obs. [Note 5]
Lawn Hill Nat. Park, at 3km S of Ranger Station	Qld	18°44'S, 138°30'E	25 Oct 2012	Obs.
Lake Moondarra, on Wallaby Track (walking trail)	Qld	20°35'S, 139°34'E	18 Oct 2012	Voucher [Note 6]
Corella River crossing, 45 km W by S of Cloncurry	Qld	20°47'S, 140°07'E	21 Oct 2012	Voucher
Freyeria putli				
Bough Shed Hole (picnic ground), Bladensburg Nat.Park, SSW of Winton	Qld	22°34'S, 142°58'E	06 Oct 2012	Obs. [Note 7]

Key to Table:

Note 1. A single male *A. lycaenoides* in moderate condition was captured in flight above a mud soak on the road shoulder adjacent to dry open forest in mid-morning, between 0900 and 0920 h (duration of visit). It was flying in company with many adults of *C. panormus* – the main species attracted to the soak (see Note 4). The male was among a sample of these lycaenids that was netted during a single sweep-stroke to determine what species were present. It is not clear whether the adult of *A. lycaenoides* was attracted to the mud soak to feed, or had been feeding, or whether it had descended from a higher patrol flight to inspect the many adults of *C. panormus* that were fluttering about the soak, and which are similarly coloured to it.

Note 2. Several males of *A. lycaenoides* were seen perched in the canopy of gallery scrub growing along the riverbank. They were active during hot conditions (30°C) patrolling periodically in sunshine sometime between 1400 and 1700 h (duration of visit). Two males were captured using a long-handled net, which gave lateral reach to foliage whilst the handler was standing on the highway bridge spanning the Little Laura River. That platform provided the elevation needed to access the mid canopy area and to secure specimens to confirm the identification of the species. The adults were localised around a couple of trees on which they frequently perched; none were seen flying elsewhere at the crossing on that visit. The trees were too far away to obtain some foliage and there was no foliage growing lower down the trunks to enable identification of what may have been a larval host plant; the larvae feed on the buds of a number of trees within at least eight plant families (Braby 2000).

Note 3 (a). My visits during the late dry season on the two days listed in the table saw several old males of *C. florinda* (ssp. *estrella*) taken in mid-afternoon, about 1410-1420 h on the 13th. The adults which were flying in dry vine thicket were localised and uncommon. (**b**): On the following day, I commenced collecting at 0935 h and captured a single similarly aged male of *C. florinda* shortly before midday. The worn condition of all of those males (and the other species seen along the riverbank) suggested that dry conditions had prevailed for several weeks up to the time of that visit, and that the October rains, which I had hoped might precede me to bring forth a fresh emergence of butterflies, had not yet come. Braby (2015) has since sampled at four sites in the Normanton region, including at the Walker Creek crossing; his surveys during May 2013 did not record this species. The site at Walker Creek adds detail to the portrayal of the species' wider distribution as indicated by Braby (2016) and helps support that new map for the area dealing with the eastern Gulf Country of northwestern Queensland. The presence of *C. florinda* northeast of Normanton was well outside its known range in northeastern Queensland at that time of the encounter, but the

revised synoptic map by Braby (2016) now indicates that the Normanton region is within the broader range of the species in the southern Gulf Country. Specimens have been lodged in the ANIC and MV.

C. florinda was the eighth of ten species of butterfly to be detected along the riverbank in the first 30 minutes of searching on the 13th, and it was one of the 15 species observed in 130 minutes (after arriving at 1350h). That stands as a low count for the coastal region of tropical Queensland based on experience; see for several examples, the counts provided by Dunn (2001) for a number of sites. A further search for another 70 minutes, ending at 1710 h (after a total of 3 hours and 20 minutes survey at the site) revealed no additional taxa, probably due to the late hour of the day. Van der Poorten and Van der Poorten (2016) have suggested that reduced flight activity during late afternoon in the tropics (unlike in cool temperate zones where butterfly territorial and feeding activities can continue unabated until dusk) may be a strategy to avoid predation during the peak feeding times of the local birds. That morning visit on the 14th, done to compare counts with the afternoon survey on the 13th, confirmed that paucity (in terms of species richness) with 15 species tallied in 115 minutes (achieved only 10 minutes quicker); further searching increased the tally to 22 species after spending 180 minutes (3 hours) there. The weather was ideal on both days for butterfly activity and the two visits yielded 23 species. The relative paucity of the lycaenids and the hesperiids characterises the late dry season, and explains, at least in part, the low tally of species recorded (i.e. the local richness) across the consecutive visits. More importantly, the lower abundance of each species in the dry explains the longer time required to maximise the counts of the species on the wing. The morning visit provided a better estimate of the fauna (represented by the adult stage) because flight activity was still at its peak on my departure at 1230 h, and that maximal activity would continue for two or more hours, before it begins to decline.

Note 4. Many adults of *C. panormus* were seen flying about and settled at a mud soak adjacent to dry open forest at the dip in the road (at 15°28'48"S 144°15'20"E), which serves as a minor waterway in the wet season and can be damp (or moist) between wet seasons. These adults were active in mid-morning between 0900 and 0920 h (duration of visit). Their sexes were left unrecorded in my field notebook, but most if not all, were males as this sex features prominently at soak gatherings (see Scott 1986, Dunn *et al*. 2009 and references therein) and among polyommatines that may visit sewage overflows (Dunn 2014: 25-26). The weather at that time was 'sunny and hot' and it was likely to have been at least 28°C – the coastal temperature recorded at the weather station at Cairns at that time (WU 2017).

Note 5. A solitary old male of *E. cnejus* was seen feeding at damp river sand within 60 centimetres of the water's edge adjacent to paperbark woodland, at 1440h. The weather was 'very hot, sunny and breezy'; the local temperature, measured at the site at the time of the feeding event, was 39.4°C with 20% humidity. Feeding at soaks is an occasional event among polyommatines in Australia but it was unusual for just a singleton to present. Nonetheless, very few butterflies were active due to the hot conditions at that time with most presumably roosting on foliage in shaded situations to limit dehydration whilst waiting for the afternoon heat to wane. Indeed, four males of *Catopsilia pyranthe* (White Migrant) (Pieridae) were seen sheltered under leaves of a shrub close by, and all lacked wariness and seemed reluctant to fly. When provoked to do so, they flew a short distance of five to ten metres before settling again, atypical of their patrolling behaviour seen during cooler conditions. Indeed, during very hot weather elsewhere in inland Queensland, I once found two swallowtails roosting on rocks in shaded habitat (Dunn 2013) – atypical behaviour not seen previously – and on another occasion, I found a mixed group of species settled beneath a single shrub. That gathering resembled an attendance at a mud soak but none was seen to be feeding (Dunn 2015: 26). A count of species seen in 60 minutes at the Gregory crossing (1420-1520 h) tallied just six, which was very low for the habitat concerned and the time of year. It suggests that adult abundance was down on that visit. Moreover, during the next hour, a ten minute inspection of mistletoe-infested eucalypt woodland at 31 km W of the Gregory River and a ten-minute inspection of spinifex shrubby woodland at 44 km W of Gregory River, both without a watercourse, revealed no butterflies on the wing and none was disturbed from foliage. A combination of very hot weather and a low abundance of the various species beyond riparian scrubs would probably explain the apparent absences of adults, and might explain as to why just a singleton was present at the soak at that time.

Note 6. Two adults of *E. cnejus* were seen in late afternoon at 1650 h flying close to the ground near herbage, typical of the species' behaviour. A fresh male was retained as a voucher (KLDC). The localised adults bordered an area of native vegetation along the walking trail (at 20°35'23"S 139° 34'27"E) where a food plant was probably close by. A quantity of flowers of *Tridax procumbens* (Asteraceae) were blooming in a moist area near the public amenities (20°35'19"S, 139°34'32"E) in the parkland adjacent to the lake, and these weed-flowers were watched for 30 minutes to see what species would come to feed. Between 1500 and 1530 h they attracted adults of *Junonia villida* (Meadow Argus) (Nymphalidae), *Zizina otis* (Common Grass-blue) and *Theclinesthes miskini* (the Mt Isa form of the Wattle Blue which occurs in 'the arid inland', and which Sibatani & Grund 1978: 20 designated as 'form 5') (Lycaenidae); each species was seen to feed one or

more times. The adults of *E. cnejus*, which were patrolling only 190 metres away, did not come to feed amongst those other species, perhaps because the daisies were outside of their home range. The harsh climate, making its presence felt by the middle of spring, may make extended flights away from the larval hosts risky, particularly if the adults cannot find nectar sources or other fluids to assist their return journeys during the heat of the day.

Note 7. An unsexed adult, almost certainly an aged female, was seen fluttering (apparently in oviposition flight) about a hirsute pea plant bearing pink flowers, which I recognised at the time as an *Indigofera* species (Fabaceae); a genus long known to be a larval host of this butterfly in Australia (McCubbin 1971, Common & Waterhouse 1981). The herbaceous legumes, of which several small plants were present and two of which bore a single flower each, were growing in a shadier area near the riverbank adjacent to open woodland in the picnic ground. At Bough Shed Hole, the *Indigofera* plants were scattered over a tiny area of sandy soil spanning about five by five metres among which no other herbs or grasses appeared to be competing with them (22°33'38"S, 142°57'39"E). I searched the broader area covering 200 metres in various directions but found no other sandy patches supporting these herbs. J.T. Moss later identified the legume as *Indigofera hirsuta* from photographs of the flowers and foliage; it is a recorded larval host of this butterfly (Braby 2000, 2016), and one that has been known for many years (Common & Waterhouse 1981).

The solitary adult, which was seen in late morning, about 1020 h, was identified to species based on the distinctive underside, displayed once she landed on the flower. I saw no others during 20 minutes spent watching at the legume patch, so I revisited the site at 1530 h that same day to check again for others, and hoped to gain a clear photograph (which is not easy given the butterfly's tininess and requires a close approach) to enhance this report of its remote presence inland. As butterfly activity in the tropics declines markedly by the beginning of late afternoon (Dunn 2017c), I had supposed that mid-afternoon, when male territorial activity is starting to wane (and when females will be less distracted due to their diminished attention) might be a more suitable time to see oviposition. Although sunshine continued, no adults visited the legumes during that quick inspection of just five minutes. An absence of any males patrolling the flowers during both visits (25 minutes of continuous watching) had suggested that the adult flight season for this butterfly was nearing closure, with that aged female perhaps being one of the last of that brood to make use of the very few remaining flowers. In the outback of Queensland, day temperatures rise quickly towards the end of October and few herbaceous flowers blossom in the woodlands afterwards. I looked for the butterfly and the legume in similar habitat elsewhere in this large National Park without

success; the species may be rare this far inland as the location stands as a remote outlier for this butterfly, but I think that mid-September might be a more suitable time of the year for peak adult activity. As I have noted for two other polyommatine butterflies near Cloncurry, namely *C. erinus* and *C. delospila*, the adult flight periods appear to end abruptly once the hotter weather sets in (Dunn 2017c).

Discussion

All of these records are from locations that fall beyond or near the boundaries of the species' distributions as interpreted from the range-fill maps provided by Braby (2000). However, some locations for two of the five species tabled may now be within the enlarged distributions proposed for the species concerned in the recent field guide on the Australian fauna. These revised maps by Braby (2016) are useful to interpret areas where the various species probably occur. However, Dunn (2017c) considered them less rigorous than the earlier versions released in 2000, as the evidence underpinning many of the extensions is unstated in the recent work (linked to the constraints and purposes of a field guide). In addition, experts may disagree as to the number of intervening populations that are required to justify broad extensions between populations at the continental level.

Braby (2000) had constructed synoptic maps by connecting regions where records were concentrated; he avoided connecting outlier areas except where a moderate number of sparsely placed records supported these. In documenting these records as new or boundary ones, I do so on that same understanding. Historically, some experts have upheld speculation as a source of comparative spatial knowledge, and which one referee for an Australian journal had argued for, over plotted evidence: "*The outcomes are that the broad maps in Common and Waterhouse (1981) and* [sic] *very good indicators of where we might expect a species to occur"* (Anon 1995 cited by Dunn & Dunn 2006: 838). The synoptic maps of 2016 may also indicate where 'we might expect species to occur', and that is fine for field observers where that is the understanding they gain from them, but the earlier ones from 2000 align more closely with where the species have been found. Hence, the usage of the new maps "should accompany the evidence-based original work of 2000 when comparing and discussing new distribution and important boundary records that make those distributions evidence-based." (Dunn 2017c: 2).

The two inland locations provided for *Anthene lycaenoides* in southern Cape York Peninsula stand alone as western boundary records along the main range of the species through the Wet Tropics biome. These offer evidence of the inland occurrence of this butterfly because there are no published records of it from west of the Divide between the 15th and 17th parallels of latitudes, despite the accumulation of many records from the nearby coastal areas and tableland region. *A. lycaenoides* may extend much farther inland but it can be hard to find by random sampling along roadsides.

The current range-fill map for *Catopyrops florinda* is worthy of scrutiny because of the major change in that species' distribution between the map by Braby (2000) and the recent revision in 2016. This species' presence at Walker Creek, NE of Normanton was well outside its known extent of occurrence in northern Queensland at that time of the encounter. However, it now lies within the broader range that the revised synoptic map offers, which extends through the southern Gulf Country. Additional records of *C. florinda* from this part of northern Australia are required to better support that supposed continuity because, at this time, records are rare. I know of just three others, which suggests that the continuity is inferential at this time. R. Eggleton (in Braby 2000) recorded the species at Johnson Creek, 70 km NW of Mount Isa, and to the northwest, Daniels and Edwards (1998) listed it from the Lawn Hill Gorge area, at the eastern extremity of Lawn Hill National Park. In addition, Braby (2000) marked an outlying population that lies in the Croydon area, ESE of Normanton but left the data that underpinned its presence there, unstated. Curiously, there is a report of juvenile stages of *C. florinda* from Yatton Creek, near Croydon by Grund (1996: 108 cf. Grund & Jordan 2008) but that particular 'Croydon' does not refer to the outback township in the north but intends a homestead in central Queensland. It is possible that this was the source data for that outlier population included on the map by Braby (2000), however, the polyommatine 'egg type 4' reported from that site was not identified until early 2008 (Grund & Jordan 2008). M.F. Braby (pers. comm.) has since remarked concerning this issue, "I can't recall the basis of the w QLD record you refer to given the distribution map for that taxon was compiled 20 years ago, but I very much doubt it would be in error. If it did not come from your atlas then most likely it was derived from the published literature, a personal communication or specimen in museum collection (e.g. ANIC)." Notwithstanding this, if mistaken usage is the case, then the argument by Braby (2016) for a broad range in western Queensland is weaker as one of the three reports has been misinterpreted. That record of presence on the map by Braby (2000) can be discarded as mistaken if left unsubstantiated in the future.

The three locations provided for *C. panormus* in the Laura region stand as southern and western boundary records for the broader range of this species. From there *C. panormus* extends westward through southern Cape York Peninsula (for which no published locations underpin this) to Kowanyama (Hancock & Monteith 2004), near the eastern coast of the Gulf of Carpentaria. These sites add detail to the portrayal of this species' wider distribution by Braby (2016) and help support the new map for that area in northwestern Queensland.

The most western report for *Euchrysops cnejus* from the southern Gulf Country of Queensland actually confirms an earlier report, rather than asserting new distribution. Daniels and Edwards (1998) had listed *E. cnejus* from one or more locations within Lawn Hill National Park and the contiguous Musselbrook Reserve but the range-fill map and accompanying text by Braby (2000) did not mention that information. Braby (2016) has since included that outlier population in far western Queensland on the

revised map of the species, rectifying that lapse in coverage in his earlier work. Nonetheless, the additional record I have provided from the Lawn Hill National Park now offers a fine location in that broader area, which supplements the general report of its presence there by Daniels and Edwards (1998), who had included the species in a checklist at the reserve level. The other records tabled for *E. cnejus* are well outside of the revised distribution that Braby (2016) has since provided. Although the regional data for this species is still scanty, these spatial records imply a much broader occurrence in the northwest of Queensland, and indicate its presence farther inland than was previously known.

The unexpected encounter with *Freyeria putli* provides a remote outlier record in western central Queensland. It may suggest that this species is far more widespread in western Queensland than is realised, as this new site is remote from the three closest locations. The Bough Shed Hole Picnic Ground is 678 km west of the Montrose Creek overflow, about 33 km S of St Lawrence – the nearest population at that latitude; that record is based on a specimen I collected in 1988, which is in the MCZH. Bough Shed Hole lies some 635 km SE of the Lawn Hill National Park and the Musselbrook Reserve region, where it was reported by Daniels and Edwards (1998). It is also 531 km SSW of Forty Mile Scrub (given as 18°06's 144°50e at 780 m a.s.l.), which Hill *et al*. (1992) reported as a location for it in inland northeastern Queensland.

The new and intervening locations tabled in this third part add to the knowledge of the spatial distribution of these smaller butterflies across northern Queensland. Dunn and Dunn (2006) argued that the paucity of spatial data from the outback of Australia is due to a lack of exploration by insect collectors across the seasons. The new records help fill part of that void but more surveys in inland areas can only strengthen the spatial knowledge of these and other butterflies over time.

> * The common name given as the 'Pale Ciliate-blue' is a peculiar spelling of it and one that has an historic origin (Waterhouse 1932). The version given by Braby (2000) offers tense agreement in line with the common names of the other species but Braby (2016: 29) has stated that the "several amendments" to the common names since 2000 (which would include this reversion) have been "based on advice and suggestions from the wider scientific community and butterfly fraternity". Incidentally, 'Ciliate' refers to one of the Ciliata, a class of protozoans and is a noun and these creatures have nothing to do with the life history of the butterfly. 'Ciliated', however, is an adjective and means fringed or surrounded by hairs, which refers to structures on the wing margins, and that would seem the better choice of the two spellings in common usage over the last two decades if this is the intended meaning. Indeed, Waterhouse (1932: 161) had remarked on how this species has "three ciliate (hair-like) tails to the hindwing" and his reference to those structures might provide the basis of the common name used for this group of butterflies that possesses these features.

Acknowledgement: John T. Moss (Qld.) identified the *Indigofera* species and offered helpful suggestions on a draft of this paper.

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Fig. 1. *Catopyrops florinda* (ssp *estrella*) male underside – Crystal Cascades, near Cairns, N.Qld.
Fig. 2. *Catochrysops panormus* male underside – Stony Creek crossing, Mt. Stuart Road, near Townsville N.Qld.
Fig. 3. *Euchrysops cnejus* female underside – River Heads, NE of Maryborough, S.Qld.
Fig. 4. *Freyeria putli* female underside – on small knoll, about halfway up the Mt. Stuart Road, near Townsville N. Qld.

Photos Kelvyn Dunn

Raising Orchard Swallowtail (*Papilio aegeus*) Caterpillars –

Paul Klicin

In a previous issue we explored raising the Common Crow caterpillar along with some of my own detailed findings regarding raising them on a new host plant. Another common and popular butterfly is the Orchard Swallowtail.

Source: Braby. The Complete Field Guide to Butterflies of Australia

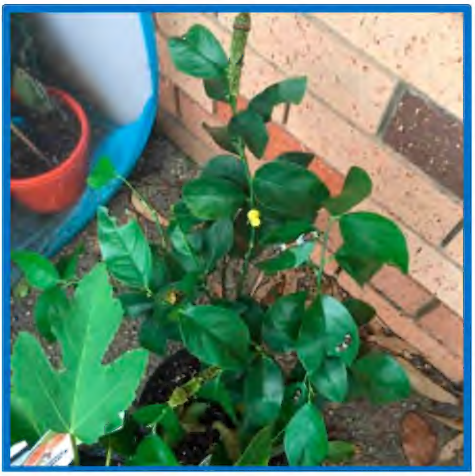
The Orchard Swallowtail's distribution is quite widespread and abundant across Australia.

The Orchard Swallowtail caterpillar is commonly found on citrus trees so if you have an orange, lemon, mandarin or lime tree or similar growing in your back yard you can almost be sure that, at some time or another, the Orchard Swallowtail butterfly has probably visited your citrus plant to lay its eggs. If you don't yet have one, do yourself a favour and go and visit your local nursery and buy one. Unfortunately, sometimes people think of these caterpillars as pests as they are eating the leaves of their citrus and don't realise that they will turn into magnificent butterflies, so often they will kill or remove them. Unless you have a small citrus tree with only a few leaves on it, it is highly unlikely that a few caterpillars will defoliate your citrus tree or cause significant damage. Try leaving them or, better still, try hand raising them. Often when wandering through plant nurseries, I have come across Orchard Swallowtail caterpillars on citrus trees and often, unfortunately, these trees have been sprayed with poison which leads to almost certain death of the caterpillars. Eventually, this poison wears off and the tree will also sprout fresh new leaves, on which butterflies love to lay eggs. Unfortunately, a local nursery close to where I live goes as far as removing the caterpillars and feeding them to their resident water dragons! I think finding a caterpillar on your citrus is actually a bonus and I'd be more likely to buy a citrus tree if it had caterpillars on it, not the other way around, as I get to have fruit and butterflies.

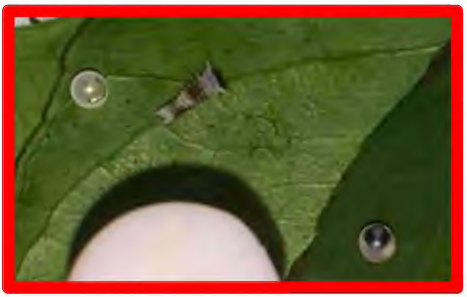
I never seem to find more than two or three eggs or caterpillars on a single citrus tree as the butterfly tends to lay only an egg or two at a time to spread the risk of losses due to parasites or other predators, such as spiders and wasps.

I found that hand raising these little beauties in a container was just as successful as raising them on a live plant in an enclosure. However, raising them on a live citrus plant is less maintenance as you don't have to keep cleaning the enclosure every day. Nor do you have to make sure they have a constant supply of fresh food. On the other hand, when raising them in a container you can keep a closer eye on them as you watch them grow, and grow fast they do. As they get big you will need to make sure you keep the food up to them more regularly, as often, overnight, they will run out of food.

These enclosures are ideal in which to keep live potted plants, along with your hungry caterpillars. These are available through club contacts.



Free range caterpillars feeding on a variety of lime tree. There are seven Orchard Swallowtail caterpillars in this photo. Can you find them all? Free ranging (as I call it) on a live plant is a great way to raise your caterpillars into spectacular butterflies.



How cool is this little guy just newly hatched from its egg? You might be able to see the hole in the egg where he chewed his way out. Can you see the black spot on the other egg? That is another caterpillar about to enter the world.

This caterpillar is having his first meal chowing down on some tasty egg shell.

A camouflage characteristic of the Orchard Swallowtail is that it looks a little like a bird dropping (if you have ever taken a really close look at bird droppings that is!).

Various growth stages of caterpillars are called instars where the caterpillar outgrows its skin, then sheds it. It will often eat its own dead skin. These stages or instars often result in the caterpillar taking on a different look or colour like these two guys (or girls). Often the caterpillar will wander off and stop eating for a day or so away from the food plant (especially when hand-raised in a container). Try not to disturb them too much and don't worry, as they are usually only shedding their old skin.

The above is one of the largest Orchard Swallowtail caterpillars I have ever seen. Unfortunately, this guy failed to emerge from its chrysalis due to either being parasitised, or poisoned from eating contaminated leaves as previously mentioned. I was really looking forward to seeing the size of this butterfly, but it wasn't to be.

Close up of a curled up, or retracted, proboscis which is used for imbibing nectar from flowers.

Orchard Swallowtail chrysalis. The colour may vary depending on the surface they decide to pupate on. If on a plant which is predominantly green, then the chrysalis often takes on a greener colour. This is a camouflage characteristic of the Orchard Swallowtail.

I'll be the first to admit that I think, up close, this Orchard Swallowtail butterfly takes on an almost alien appearance. Imagine if our sizes were reversed. I certainly wouldn't be hanging around to admire it for too long. Gives a new meaning to bug-eyed!

I managed to capture some nice photos after releasing this male Orchard Butterfly.

I thoroughly recommend raising these caterpillars as they are a lot of fun, and kids will just love them. They are a large butterfly, so I reckon they provide real bang for buck.

In a future issue: Raising Lesser Wanderers. If you have more questions or to see more, please go to https://www.facebook.com/butterfliesandcaterpillars/ or https://www.facebook.com/groups/187619097411/

The Butterfly and Other Invertebrates Club (BOIC) tries to organize field trip outings for most months of the year and there is always a lot to see and learn, so come along if you can. Meanwhile…….happy bug-hunting.

Photos Paul Klicin

Ross Kendall, Dawn and Bernie Franzmann

The BOIC poster drew much interest and was a spectacular way of highlighting the aims and endeavours of our club and its members. The Entomological Society of Queensland prepared and produced this poster at no cost to BOIC. Geoff Monteith, also a BOIC member, was instrumental in the production of the posters and the organisation of the dinner. It was great to catch up with, and share ideas with ESO members who are also members of BOIC. The venue was perfect and the meal was very enjoyable. I look forward to the next one.

YOU ASKED

My name is Théo Léger, I am a PhD student in Dresden, Germany, working on the molecular phylogeny of the Crambinae and the Scopariinae (Lepidoptera: Crambidae). I am contacting you because I would like to find some reported observations of eggs of *Hednota*, an endemic Australian genus.
I am currently investigating the evolution of the oviposition modus in the Crambinae. Two types of eggs are observed within the subfamily: in the tribe Crambini, the eggs are simply laid on the ground, without adhesive, whereas on the other groups, the eggs are glued in clusters on the host plant. When plotted on my phylogenetic tree, we observe that the glued eggs seem to be the ancestral state and that the other condition evolved out of it. According to the pictures of Koch (1965), the eggs seem to be non-adhesive, but he made no mention of it in the text and the pictures are not enough to draw conclusions. So I wanted to know if you knew some amateur micro-lepidopterists that might have observed that, or one that could pay particular attention by the next light-trapping session, for example by letting a gravid female in a jar for 24 hours and observe how the eggs are laid.
Your help would be greatly appreciated!

Best Regards,
Théo Léger, PhD student
Senckenberg Museum für Tierkunde
Königsbrücker Landstr. 159
01109 Dresden
Germany https://www.researchgate.net/profile/Theo_Leger

Planning and General Meeting

What: Our quarterly planning meetings are informative and interesting and we welcome members to contribute to discussion. After the meeting Dr Alisha Steward will be leading and assisting in the collection of specimens of macroinvertebrates from the ponds at the ECO/Toohey Forest centre. Following the collection from the ponds, Alisha will demonstrate and help with the analysis of the specimens. During this activity Alisha will be explaining the procedures and explain how the equipment works and its use. This session will be "hands on" and interesting. Come along and get your hands wet.

When: 10am Saturday 10th February 2018

Where: The Eco Centre, Canopy Room, Griffith University campus. Parking is plentiful and free.

What to bring: Enthusiasm is welcome**.** Tea, coffee and biscuits will be provided.

If attending, please respond to: Dawn Franzmann (ph 3325 3573; 0419 786 369 email berndawn@gmail.com)

Proposed Invertebrates Survey of the Samford EcoCorridor with the Samford Branch of SGAP

BOIC has been invited by the Samford branch of SGAP to conduct an invertebrate survey of the Samford EcoCorridor, Mt Samford Rd, on Sunday 18th February from 9-11 am. Further details of this activity are not available at this time but will be circulated by email closer to the date. We need to gauge the interest of members who have the skills to identify the invertebrates and are willing to help on this day. If you are able to assist with the survey, please contact Ross Kendall (ph 0402 254 370 email admin@butterflyencounters.com.au) or Dawn Franzmann (ph 3325 3573; 0419 786 369 email berndawn@gmail.com)

Key facts of the project

"As at July 2017, over 4500 plants have been planted, including those on the river bank to help with erosion control.

The revegetation areas comprise 148 species of indigenous rainforest trees and shrubs from Samford's subset of RE12.3.1 and 19 understorey species and groundcovers, which have dramatically increased the biodiversity of the site. Important canopy species include *Drypetes deplanchei*, *Niemeyera antiloga*, *Dissiliaria baloghioides* and *Barklya syringifolia*. Unusual local species include *Acacia bakeri*, *Atalaya multiflora*, *Backhousia* (*was Choricarpia*) *subargentea*, and *Medicosma cunninghamii*. One of the most significant inclusions is *Macadamia ternifolia*, which is number 12 on Moreton Bay Council's priority list of species (cf. Dugong is number 10).

As at July 2017, 128 bird species had been recorded on site (including in the adjacent remnant and riverine vegetation) during our monthly surveys. Three bird species have already bred successfully in the revegetated areas (Brown Honeyeater, Double-barred Finch and Superb Fairy-wren)."

You can find further information on their Facebook page (https://www.facebook.com/EcoCorridor/)

DISCLAIMER

The magazine seeks to be as scientifically accurate as possible but the views, opinions, and observations expressed are those of the authors. The magazine is a platform for people, both amateur and professional, to express their views and observations about invertebrates. These are not necessarily those of the BOIC. The manuscripts are submitted for comment to entomologists or people working in the area of the topic being discussed. If inaccuracies have inadvertently occurred and are brought to our attention we will seek to correct them in future editions. The Editor reserves the right to refuse to print any matter which is unsuitable, inappropriate or objectionable and to make nomenclature changes as appropriate.

ACKNOWLEDGMENTS

Producing this magazine is done with the efforts of:

- Those members who have sent in letters and articles
- Lindsay Popple who provided the cover photograph
- Daphne Bowden who works on layout, production, and distribution
- Ross Kendall, John Moss and Martyn Robinson for scientific referencing and proof-reading of various articles in this issue of the magazine

ARE YOU A MEMBER?

Please check your mailing label for the date your membership is due for renewal. If your membership is due, please renew as soon as possible. **Annual membership fees are $30.00 for individuals, schools, and organizations**. If you wish to pay electronically, the following information will assist you: BSB: **484-799**, Account No: **001227191**, Account name: **BOIC**, Bank: **Suncorp**, Reference: your membership number and surname e.g. **234 Roberts.**

Butterfly and Other Invertebrates Club Inc.
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Next Club event: Planning and General Meeting – 10th February 2018

Spider Talk – 12th August Planning Meeting – *Bernie Franzmann*

This talk was given by Robert Whyte, the principal author of the newly-published "A Field Guide to Spiders of Australia." The book was reviewed in the most recent Metamorphosis.

Robert delivered the talk with wit and humor, and the presentation was enhanced by the excellent photographs. I particularly liked the ant-mimicking spiders, the peacock spiders and the alien butt spider (Google it).

He covered not only spiders themselves but also ranged into aspects of spider venom and silk.

A couple of urban myths were dispelled. The first was that the common daddy long legs had such toxic venom it could kill a person but its fangs were too short to penetrate human skin. The second was that a white–tailed spider bite can lead to a large flesh-eating wound. Neither of these is true.

The most dangerous spider in Australia, probably responsible for the most trauma, is not the funnel web but is the huntsman. Yes, the one that drops down from the car roof onto the driver, causing panic, resulting in, sometimes, disastrous consequences.

We learnt a bit about spider silk which is stronger than steel but obviously far more flexible. He told us about a silk sheet made from collecting silk from a million golden orb spiders in Madagascar.

Robert only started studying spiders about 10 years ago and now he is an expert. So all you readers who have said from time to time, "I think I will start studying some invertebrate group", start today and in 10 years you could be an expert.

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Entomological Society of Queensland's Inaugural Perkins Memorial Dinner – 12th September 2017 – *Dawn Franzmann*

We were honoured and privileged as a Club to receive an invitation to attend the Inaugural Perkins Memorial Dinner held at the St Lucia Golf Club on 12th September. Our, President, Ross Kendall was invited to give a speech as part of the official welcome. Ross's speech was short and very enjoyable. The Perkins Memorial Lecture was held prior the same day and was delivered by Professor Madeleine Beekman, her topic being "Why I Study Social Insects".

The Dinner was a very enjoyable occasion, mixed with shared experiences and conversations by many entomologists, professional and others just interested in insects in general. The photographic montages and posters on display were absolutely amazing.